REMARKS

Applicant respectfully requests reconsideration of the instant application on the basis of newly amended Claims 1 and 4. Claims 1 and 4 are the main claims and the remaining claims are directly or indirectly dependent upon those.

The Examiner has rejected the claims as being unpatentable over U.S. Patent No. 5,514,928 by Niewold (*Niewold*) in view of U.S. Patent No. 5,573,173 by van der Wilk *et al.* (*van der Wilk*) and further in view of U.S. Patent Application Publication No. 2004/0033455 by Tonkovich *et al.* (*Tonkovich*)[1]. It is believed that Claims 1 to 12 are clearly distinguishable over these three references for the reasons that will be set forth.

Support for the amendment of Claims 1 and 4 is found in Figure 5 and others. M.P.E.P. § 608.04 states that "the applicant may rely not only on the specification and drawing" to establish a disclosure.

Support for new Claims 11-12 is found in paragraph [0009] in the specification.

35 U.S.C. § 103 Grounds for Rejection

The Examiner rejected Claims 4, and 6-10 under 35 U.S.C. § 103(a) as being unpatentable over *Niewold* in view of *van de Wilk*; and, the Examiner rejected Claims 1-2 under 35 U.S.C. § 103(a) as being unpatentable over *Niewold* in view of *van de Wilk* and further in view of *Tonkovich*. Applicant respectfully traverses these rejections for the reasons discussed below.

Applicant's invention is directed toward solving problems associated with bonding a microchannel plate (MCP) to a dielectric insulator. Generally, bonding with an MCP required

brittle material with low shear strength. Also, prior to the present invention solder or brazing materials were required.

Niewold teaches fabricating an image intensifier tube having a MCP with a metallization coating "sufficiently thick to act as an electrical conductor across the face of the microchannel plate **30**." Col. 8, lines 46-48. However, "a peripheral edge portion **70** of the glass disk is exposed and acts as an electrical insulator against shorting across the microchannel plate **30**." Col. 8, lines 51-54. The diffusion bonding in *Niewold* is to bond with an adjacent microchannel plate in a manner such that the bonding material does not "close or partially obstruct the microchannels to interfere with the operation of the microchannel plate **30**." Col. 8, line 54 to col. 9, line 32.

Van de Wilk discloses a vacuum tube having a ceramic element. In Figure 4, a ceramic spacer **41** is disposed between two electrodes G_1 and G_2. One side of the ceramic spacer **41** has a layer **44** of silver and a filler between the ceramic spacer and the electrode G_1. Similarly, an opposing side of the ceramic spacer **41** has a layer **47** of copper, silver or gold between the ceramic spacer and the electrode G_2. The ceramic spacer **41** of *van der Wilk* is not described as an insulator.

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[1] In the subject Office Action of January 27, 2004 and the attached Form PTO-892, the *Tonkovich* reference was cited as U.S. Patent Application Publication No. 2004/003455. Applicants believe that the correct citation should be No. 2004/0033455.

Thus, the bonding coating of *Niewold* and that of the present invention have different functions, and one of ordinary skill in the art would not have been motivated to substitute *Niewold's* diffusion bond over the microchannels and exposed peripheral edge portion acting as an insulator with the dielectric insulator that is deposited with the diffusion bonding material of the present invention. There is no teaching of the method or device for bonding a dielectric insulator to a MCP without the use of retainers or solder/braze materials. In fact, *Niewold* makes it clear (col. 8, line 65 to col. 9, line 10) that the MCPs are mounted "individually and are secured on the ledge **36** with a spring ring **40**."

Even if one were to insert a dielectric insulator (and there is no suggestion of doing so in either *Niewold*, *van der Wilk* or *Tonkovich*) in *Niewold*'s image intensifier tube about the periphery of the MCP, the diffusion bond would still be between the microchannel portions of two adjoining MCPs.

By this structure Applicants are able to achieve the advantages which have hitherto not been achievable through any adaptation of the prior art. It is therefore believed to be clear that the particular structure of Applicants' invention is extremely important and is not a mere matter of design. It should also be noted that the *Niewold* reference has been available since May 7, 1996. Between that time and the present, no one, except the Applicants, has constructed or demonstrated diffusion bonding a MCP to a dielectric insulator without the disadvantages discussed above and which are clearly set forth on the first few pages of Applicants' specification. It is certainly believed to be pertinent that no-one has achieved or anticipated Applicants' structure despite the availability of the reference.

It is improper to use hindsight having read the Applicants' disclosure to "pick and choose" among isolated prior art references to disparage the claimed invention. In re Fine, 837

F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). Even where an invention is, as a whole, fully disclosed by a combination of prior art elements, such elements cannot be combined to defeat a patent as obvious unless the art teaches or suggests the desirability of making the combination. ASC Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). Thus, the mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, U.S.P.Q.2d 1780 (Fed. Cir. 1992). Finally, it is the invention as a whole that is important. Focusing on the obviousness of substitutions and differences, instead of on the invention as a whole, is a legally improper way to simplify the often difficult determination of obviousness. Gillette Co. v. S. C Johnson & Son, Inc., 919 F. 2d 720, 16 U.S.P.Q. 1923 (Fed. Cir. 1990).

Independent Claim 1, as amended, recites the following elements, the most pertinent to this discussion being presented in bold type for the convenience of the Examiner:

> A method for bonding a microchannel plate to a dielectric insulator comprising the steps of:
>
> the microchannel plate and the dielectric insulator are deposited with a thin film consisting of a suitable metal selected for optimum diffusion at elevated temperatures and pressure over compatible exterior faces;
>
> **the metallized MCP and dielectric insulator are aligned with the dielectric insulator disposed about the periphery of the microchannel plate** and placed in a bonding fixture and a compression force is applied sufficient for the compatible exterior faces of the MCP

and dielectric insulator to initiate a diffusion bonding process at a selected temperature; and

the bonding fixture securing the compressed metallized MCP and dielectric insulator is placed in a vacuum heat chamber for accelerating the diffusion bond between the MCP and the dielectric insulator.

Applicant respectfully submits that the combination of *Niewold* with *van der Wilk* or *Tonkovich* does not disclose, teach, or suggest the metallized MCP and dielectric insulator being aligned with the dielectric insulator disposed about the periphery of the microchannel plate as recited by amended Claim 1 or 4.

Moreover, even if *Niewold* could be combined with *van der Wilk* or *Tonkovich*, the combination provides no teaching of the metallized MCP and dielectric insulator being aligned with the dielectric insulator disposed about the periphery of the microchannel plate. Therefore, Claim 1 and 4 are not obvious in light of the cited art and Applicant respectfully submits that this rejection should now be withdrawn.

Dependent Claims 2-3 and 5-10 that depend from independent Claim 1 or 4 are also not made obvious by *Niewold* in view of *van de Wilk* and further in view of *Tonkovich* because they include the limitations of Claim 1 or 4 and add additional elements that further distinguish the art. Therefore, Applicant respectfully requests that Claims 1-12 be allowed.

New Claims

New Claims 11 and 12 are added to more fully claim the present invention. Claim 11 depends from Claim 1; and, Claim 12 depends from Claim 4. Accordingly, Applicant

respectfully submits that Claim 11-12 are patentable because they include all the limitations of Claim 1 or 4 and add additional elements that further distinguish the art.

Double Patenting Rejection

The Examiner has also provisionally rejected the claims under the judicially created doctrine of obviousness-type double patenting. Applicants' intend to submit a terminal disclaimer should the claims be found allowable and the double patenting rejection maintained.

Conclusion

Applicant has now made an earnest attempt to place this case in condition for allowance. In light of the amendments and remarks set forth above, Applicant respectfully requests reconsideration and allowance of Claims 1-12.

If there are matters which can be discussed by telephone to further the prosecution of this Application, Applicant invites the Examiner to call the attorney at the number listed below at the Examiner's convenience.

Respectfully submitted,

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ATTACHMENT A

LISTING OF CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

Claim(s)

1. (Currently Amended) A method for bonding a microchannel plate to a dielectric insulator comprising the steps of:

the microchannel plate and the dielectric insulator are deposited with a thin film consisting of a suitable metal selected for optimum diffusion at elevated temperatures and pressure over compatible exterior faces;

the metallized MCP and dielectric insulator are aligned with the dielectric insulator disposed about the periphery of the microchannel plate and placed in a bonding fixture and a compression force is applied sufficient for the compatible exterior faces of the MCP and dielectric insulator to initiate a diffusion bonding process at a selected temperature; and

the bonding fixture securing the compressed metallized MCP and dielectric insulator is placed in a vacuum heat chamber for accelerating the diffusion bond between the MCP and the dielectric insulator.

2. (Original) The method of claim 1 wherein the metal suitable for the deposition of the thin film is selected from the group consisting of gold, silver and copper.

3. (Original) The method of claim 1 wherein the dielectric insulator is a sapphire ring.

4. (Currently Amended) A microchannel plate body assembly of the type including a microchannel plate suitable for electron amplification comprises:

a microchannel plate (MCP) having a bonding surface, and a dielectric insulator unit having a bonding surface compatible with the bonding surface of the MCP; the dielectric insulator being disposed about the periphery of the microchannel plate; and

the bonding surface of the MCP being diffusion bonded to the compatible diffusion bonding surface of the diclectric insulator.

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Listing with Markings
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5. (Original) The invention of claim 4 wherein the dielectric insulator is a sapphire ring.

6. (Original) The invention of claim 4 wherein the compatible surface of the MCP has a thin metallic film deposited thereon prior to bonding of the MCP and the dielectric insulator.

7. (Original) The invention of claim 4 wherein the compatible surface of the dielectric insulator has a thin metallic film deposited thereon prior to bonding of the MCP and the dielectric insulator.

8. (Original) The invention of claim 6 wherein the thin film includes a metal selected from the group consisting of gold, silver, and copper.

9. (Original) The invention of claim 7 wherein the thin film includes a metal selected from the group consisting of gold, silver, and copper.

10. (Original) The invention of claim 4 wherein the microchannel plate body assembly is adapted for use in an image intensifier tube.

11. (New) The method of claim 1 wherein the dielectric insulator is composed of material selected from the group consisting of sapphire and silicon nitride.

12. (New) The invention of claim 4 wherein the dielectric insulator is composed of material selected from the group consisting of sapphire and silicon nitride.

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